

Spot Safety Project Evaluation

Project Log # 200501246

Spot Safety Project # 10-97-005

**Spot Safety Project Evaluation, of the Flashing Traffic Signal Installation,
At the Intersection of US 601-Concord Hwy and SR 1004-SR1612-Lawyers Rd, Union County**

Documents Prepared By:

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Date

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 10-97-005 – The Intersection of US 601-Concord Hwy and SR 1004-SR1612-Lawyers Rd, Union County

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis and an Odds Ratio comparison analysis of the treatment data has been completed to measure the effectiveness of the spot safety improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of an overhead flashing traffic signal. Senator Aaron Plyler originally requested improvements. Both US 601-Concord Hwy and SR 1004-SR1612-Lawyers Rd are two-lane facilities at the treatment intersection. US 601-Concord Hwy has a posted speed limit of 55 mph and SR 1004-SR1612-Lawyers Rd has a posted speed limit of 45 mph within the vicinity of the intersection. The subject location is controlled by stop signs on SR 1004-SR1612-Lawyers Rd.

The initial crash analysis for this location was completed from January 1, 1993 through December 31, 1996 with a total of eight reported crashes. According to the initial crash analyses, there were five Angle crashes, two Rear-End crashes, and one passing vehicle related crash resulting in one fatality, one class B injury, and six class C injuries. The final completion date for the improvement at the subject intersection was on November 20, 1997.

Comparison Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from October 1, 1997 through January 31, 1998. The before period consisted of reported crashes from April 1, 1991 through September 30, 1997 (6 Years, 6 Months) and the after period consisted of reported crashes from February 1, 1998 through July 31, 2004 (6 Years, 6 Months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The analysis also consisted of two different sets of data, the treatment and the comparison data. The treatment data consisted of all crashes within 150 feet of the subject intersection. The comparison data consisted of a sum of all crashes within 150 feet of eight intersections located near the treatment intersection. The eight intersections that comprise the comparison data are as follows:

US 601-Concord Hwy at SR 1547-Brief Rd,
 US 601-Concord Hwy at SR 1542-Old Dutch Rd,
 US 601-Concord Hwy at NC 218,
 US 601-Concord Hwy at SR 1611-Clontz Long Rd,
 US 601-Concord Hwy at SR 1367-Unionville Indian Trail Rd,
 US 601-Concord Hwy at SR 1530-Pennigar Rd,
 US 601-Concord Hwy at SR 1613-CJ Thomas Rd, and
 US 601-Concord Hwy at SR 1655-Chaney Rd

Please see attached *Location Map* for further detail. The following data table depicts the Naive Before and After Analysis for the treatment and comparison intersections. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	13	12	- 7.7
Total Severity Index	17.22	4.70	- 72.7
Frontal Impact Crashes	10	9	- 10.0
Frontal Severity Index	20.60	5.11	- 75.2
Volume	6200	9700	56.5

Comparison Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	75	105	40.0
Total Severity Index	13.15	10.39	- 21.0
Frontal Impact Crashes	62	62	0.0
Frontal Severity Index	14.87	15.46	4.0
Volume	6000	6800	13.3

Odds Ratio: Treatment versus Comparison

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Treatment Total Crashes	13	12	---
Comparison Total Crashes	75	105	- 34.1 %
Treatment Frontal Impact Crashes	10	9	---
Comparison Frontal Impact Crashes	62	62	- 10.0 %

The naive before and after analysis at the treatment location resulted in an 7.7 percent decrease in Total Crashes, a 72.7 percent decrease in the Total Severity Index, and a 56.5 percent increase in Average Daily Traffic (ADT). The comparison location experienced a 40.0 percent increase in Total Crashes, a 21.0 percent decrease in the Total Severity Index, and a 13.3 percent increase in ADT. The before period ADT year was 1994 and the after period ADT year was 2001.

The Odds Ratio is used as another means of calculating the treatment effect. The total crashes in the before and after period from the Comparison Strip are used to calculate the percent reduction in total crashes for the Treatment Intersection. As shown in the previous table, using the Odds Ratio calculation, there is a 34.1 percent decrease in Total Treatment Intersection crashes and a 10.0 percent decrease in Frontal Impact Treatment Intersection crashes.

Results and Discussion

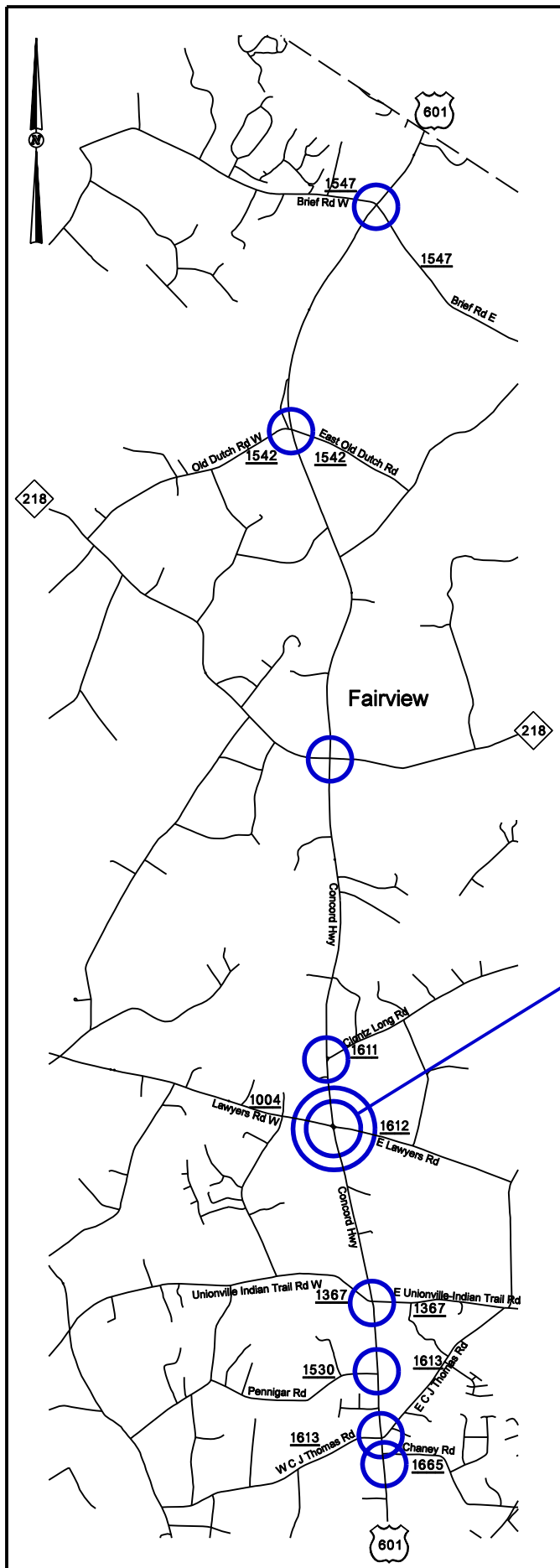
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 7.7 percent decrease in Total Crashes and a 10.0 percent decrease in Frontal Impact Crashes. Using the Odds Ratio to calculate the treatment effect resulted in a 34.1 percent decrease in Total Crashes and a 10.0 percent decrease in Frontal Impact Crashes at the Treatment Intersection. The summary results above demonstrate that the treatment location appears to have had a decrease in the number of crashes from the before to the after period using both analysis methods. In addition to the treatment intersection experiencing a decrease in the number of crashes, the crash severity also decreased dramatically (72.7 percent for Total Crashes) from the before to the after period.

Please see the attached Treatment Site Photos. Photos are provided for each leg of the intersection. As shown in the photos, it appears that the treatment intersection approaches are currently undergoing widening for turn-lanes.

The countermeasure crash reduction for Total Crashes at the subject intersection can be in the range of a 7.7 percent decrease to a 34.1 percent decrease in crashes. The countermeasure crash reduction for Frontal Impact Crashes at the subject intersection is a 10.0 percent decrease in crashes. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors.

Evaluation of Spot Safety Project Number 10-97-005

Location Map, Union County



Comparison Sites:

US 601-Concord Hwy at SR 1547-Brief Rd

US 601-Concord Hwy at SR 1542-Old Dutch Rd

US 601-Concord Hwy at NC 218

US 601-Concord Hwy at SR 1611-Clontz Long Rd

US 601 at SR 1367-Unionville Indian Trail Rd

US 601-Concord Hwy at SR 1530-Pennigar Rd

US 601-Concord Hwy at SR 1613-CJ Thomas Rd

US 601-Concord Hwy at SR 1665-Chaney Rd

*Treatment Site: US 601-Concord Hwy at
SR 1004-SR1612-Lawyers Rd*

Treatment Site Photos (Taken on March 10, 2005)



Looking north on US 601-Concord Hwy



Looking south on US 601-Concord Hwy

Treatment Site Photos (Taken on March 10, 2005)



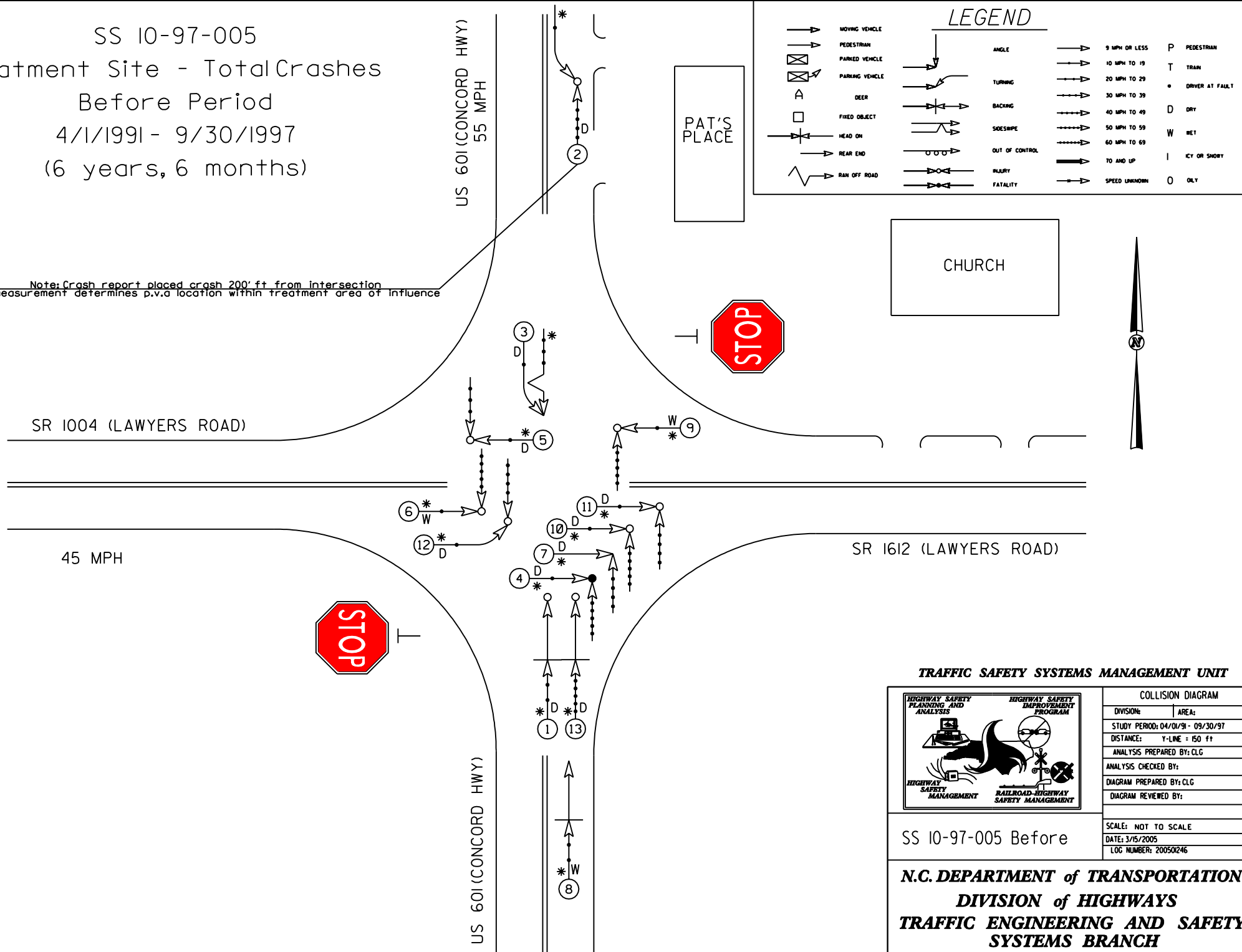
Looking west on SR 1612-Lawyers Rd



Looking east on SR 1004-Lawyers Rd

SS 10-97-005
Treatment Site - TotalCrashes
Before Period
4/1/1991 - 9/30/1997
(6 years, 6 months)

Note: Crash report placed crash 200' ft from intersection
Field measurement determines p.v.o location within treatment area of influence



SS 10-97-005
 Treatment Site - TotalCrashes
 After Period
 2/1/1998 - 7/31/2004
 (6 years, 6 months)

